

Liquefied Natural Gas, Vessel Safety and Security

CDR John Cushing
Chief, Vessel & Facility Operating Standards
USCG Headquarters
(202) 372-1410



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DOE LNG Forum
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LNG Vessels

- Exceptional Safety Record
 - +35,000 safe voyages
- Designed, built, manned & operated to highest maritime industry standards
- Flag State & Port State Control compliance programs
- Suite of mitigation measures for safety, security & waterways management risks



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2

Moss Spherical Tank LNG Carrier



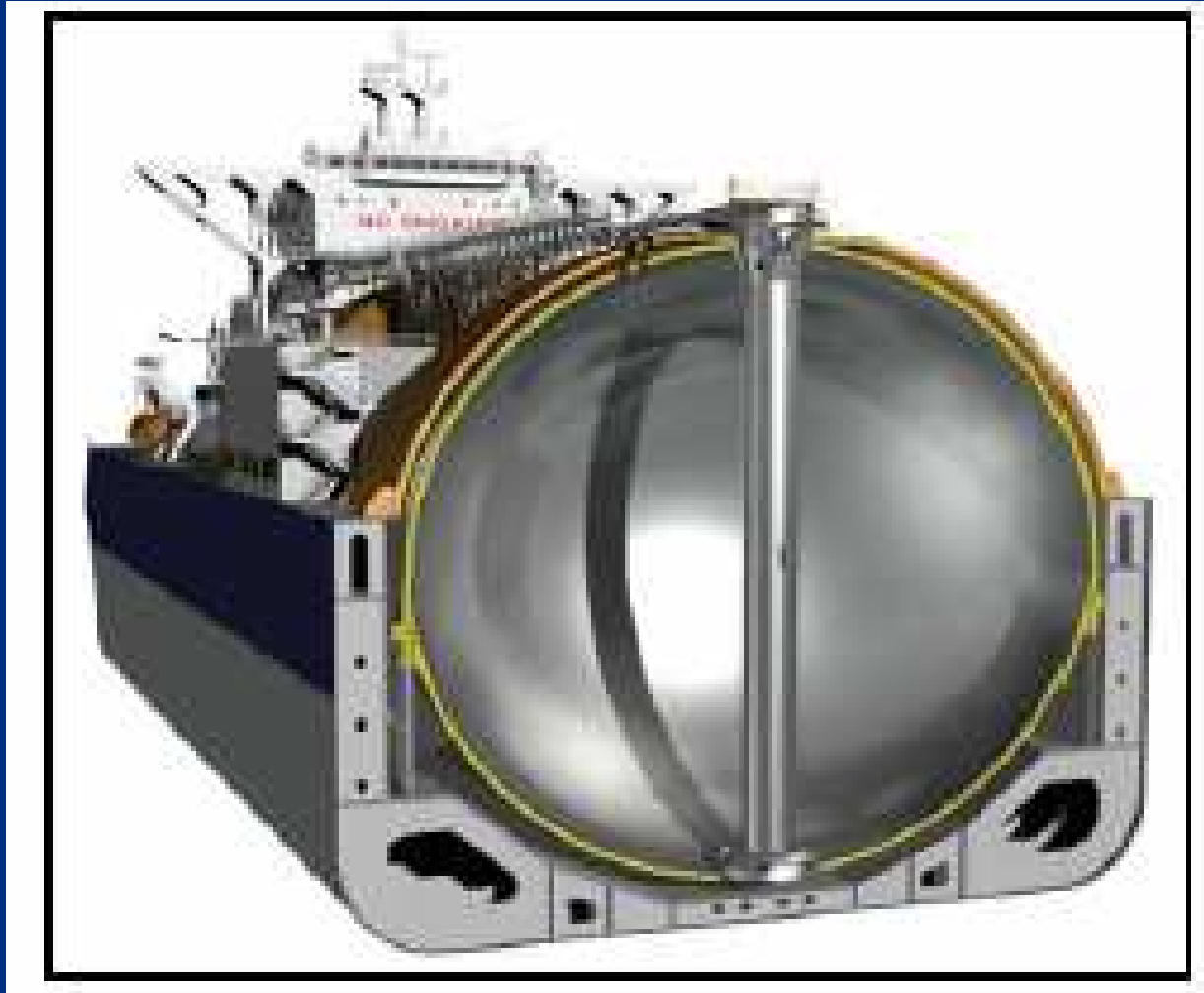
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3

Moss Spherical Tank Design



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Membrane Tank LNG Carrier



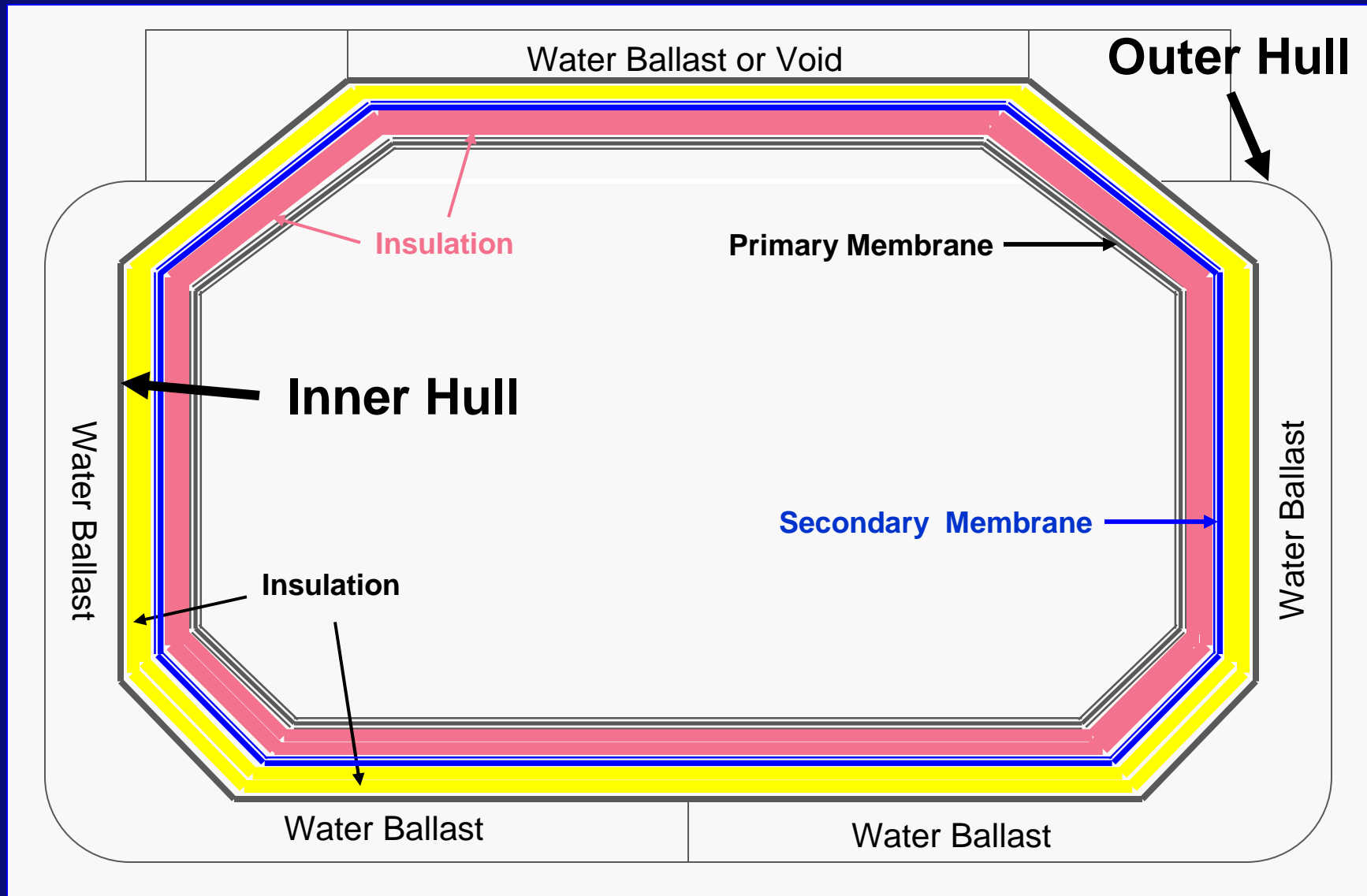
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5

Membrane Tank Design



Membrane Tank Interior



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7

LNG Vessel Safety Rules

- **IMO:** International Code for Construction & Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)
- **46 CFR 154:** Safety Standards for Self Propelled Vessels Carrying Bulk Liquefied Gases
- Standards For Training, Certification and Watchkeeping (STCW 95)
- IMO Certificate of Fitness
 - USCG Certificate of Compliance
 - Annual examinations



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LNG Vessel Safety Rules

- Vessel Construction, Firefighting, Life Saving
- Intrinsically-safe Electrical Systems
- Vapor Recovery & Detection Systems
- Tank Overfill Protection
- Tank Overpressure Relief Valves
- Emergency Shutdown for Cargo Transfers
- Cargo Transfer and Emergency Procedures



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9

LNG Vessel Security Rules

- **ISPS:** International Ship & Port Facility Security Code
- **MTSA:** Maritime Transportation Security Act of 2002
- Vessel Security Regs - 33 CFR 104
 - *Vessel Security Assessments & Security Plans*
 - *Company & Vessel Security Officers*
 - *Vessel Security Officers*
- Plans require:
 - *Access control & identification; monitoring; restricted area designations; cargo handling; and procedures for receiving fuel & ship's stores*



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Reducing LNG Vessel Security Risks

- Advance Notice of Arrival - 96 hours
- Complete vetting of crew against several law enforcement and intelligence databases & watch lists
- Area Maritime Security Plan
- Armed vessel escorts, security boardings & positive control measures



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11



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